

Remarks

The Office Action dated April 27, 2006, and made final, has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-4, 6-8, 10-11, 13, and 15-20 are pending in this application. Claims 1-8, 10-11, 13, and 15-20 stand rejected. Claim 5 has been cancelled.

In accordance with 37 C.F.R. 1.136(a), a three month extension of time is submitted herewith to extend the due date of the response to the Office Action dated April 27, 2006, for the above-identified patent application from July 27, 2006, through and including October 27, 2006.

In accordance with 37 C.F.R. 1.17(a), authorization to charge a deposit account in the amount of \$1020.00 to cover this extension of time request also is submitted herewith.

The objection to the drawings under 37 CFR 1.48(p)(4) is respectfully traversed.

An amended Figure 4 deleting reference number 164 is submitted herewith for approval. Applicants submit that the drawings meet the requirements of 37 CFR 1.48(p)(4). Accordingly, Applicants respectfully request that the objection to the drawings under 37 CFR 1.48(p)(4) be withdrawn.

The objection to the drawings under 37 CFR 1.83(a) is respectfully traversed.

Applicants submit herewith an amended Figure 8, for approval. Figure 8 is a sectional view of originally filed Figure 4 that illustrates support beam 150 received in groove 122 of support plate 100. Support for this amendment is found in paragraph [0026] and originally filed Claim 1. No new matter has been added.

Further, Claims 1 and 13 have been amended to recite "at least one groove in said bottom surface, each said groove sized to engage one of said support beams where a portion of said

beam is positioned in said groove, said removable support plate in direct contact with said beam". Amended Figure 8 clearly illustrates the support beam 150 positioned in the groove 122 and that the support beam 150 and the support plate 100 are in direct contact.

For the reasons set forth above, Applicants respectfully request that the objection to the drawings under 37 CFR 1.83(a) be withdrawn.

The objection to the specification under 35 U.S.C. 132(a) is respectfully traversed.

Applicants have amended paragraph [0026] and Figure 4 to delete reference number 164. Also, Figure 8 has been amended to remove the protrusion from the beam and reference number 164. Applicants submit that Figure 8 is a sectional view of originally filed Figure 4 that illustrates support beam 150 received in groove 122 of support plate 100. Support for this Figure is found in originally filed paragraph [0026] and originally filed Claim 1. No new matter has been added. Further, Applicants submit that Figure 8 is a schematic illustration that shows the relationship of the elements of the core support apparatus. Figure 8 is not a construction drawing meant to show exact sizes of the beam, the support plate, and the groove.

For the reasons set forth above, Applicants respectfully request that the objection to the specification under 35 U.S.C. 132(a) be withdrawn.

The rejection of Claim 5 under 35 U.S.C. § 112, first paragraph, is respectfully traversed.

Claim 5 has been canceled.

For the reasons set forth above, Applicants respectfully request that the Section 112, first paragraph, rejection of Claim 5 be withdrawn.

The rejection of Claims 1-8, 10, 11, 13, and 15-20 under 35 U.S.C. § 112, first paragraph, is respectfully traversed.

Applicants respectfully submit that the subject matter in the claims is described in the specification to enable one skilled in the art to make and use the invention. Figure 2 has been previously amended to better show opening 142 which permits the grooves in the support plates to receive the support beams. Also, Applicants submit that one skilled in the art would know how thick the support plates would need to be to function in a nuclear reactor and to support the fuel assemblies. Further, Applicants submit that the specification does describe that the support beams are received in the grooves of the support plates (see paragraph [0026], first sentence).

Also, Applicants disagree with the assertion at page 3 of the Office Action that "there is NO WAY the invention could function as claimed . . . It does NOT appear that two immediately adjacent/adjoining plates would be able to cover the SAME intersection of support beams because said extension (140) is covering said intersection of said beams and would appear to interfere with the same extension from said immediately adjacent/adjoining plates."

Applicants submit that the Figures are schematic illustrations that show the relationship of the elements of the core support apparatus. The Figures are not construction drawings meant to show exact sizes of the beams, the support plates (including the extension), and the grooves. Applicants submit that one skilled in the art reading the specification along with the drawings would be capable of making and using the claimed invention without undue experimentation. Also, one skilled in the art would know how to make any dimension changes (in the schematic Figures) that are needed to the plates and the beams that are needed to accommodate the size of the nuclear reactor pressure vessel.

Further, the Federal Circuit has held that "Patent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification

information readily understood by practitioners, lest every patent be required to be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field." *Verve LLC v. Crane Cams Inc.*, 65 USPQ2d 1051, 1053-1054 (Fed Cir. 2002).

Claim 5 has been canceled.

For the reasons set forth above, Applicants respectfully request that the Section 112, first paragraph, rejection of Claims 1-8, 10, 11, 13, and 15-20 be withdrawn.

The rejection of Claims 1-8, 10, 11, 13, and 15-20 under 35 U.S.C. § 112, second paragraph, is respectfully traversed.

Claims 1 and 13 have been amended to recite "a plurality of removable support plates disposed on said plurality of support beams, each said removable support plate comprising a top surface and an opposing bottom surface, and at least one groove in said bottom surface, each said groove sized to engage one of said support beams where a portion of said beam is positioned in said groove, said removable support plate in direct contact with said beam". Applicants submit that Claims 1 and 13 are definite and particularly point out and distinctly claims the subject matter that applicants regard as their invention. Applicants further submit that one skilled in the art reading Claims 1 and/or 13 in conjunction with the specification, including the drawings would understand the metes and bounds of the invention. One skilled in the art would understand what is meant by "each said groove sized to engage one of said support beams where a portion of said beam is positioned in said groove". One skilled in the art would know that if the beam width is wide, the groove has to be at least as wide as the beam to engage the beam with a portion of the beam positioned in the beam.

Applicants submit that the claims have been amended to provide proper antecedent basis for all terms in the claims.

Claim 5 has been canceled.

For the reasons set forth above, Applicants respectfully request that the Section 112, second paragraph, rejection of Claims 1-8, 10, 11, 13, and 15-20 be withdrawn.

The rejection of Claims 1-6 and 13 and 15 under 35 U.S.C. § 102(b) as being anticipated by Anthony (U.S. Patent No. 4,127,445) is respectfully traversed.

Anthony describes a lower core support structure (18) for a nuclear reactor (10). The support structure includes a plurality of support beams (19 and 21) forming a grid network of support beams. Metal pads (22) and alignment pins (23) are welded to the upper surface of the support beams. Fuel assemblies (16) are supported and aligned by the pads and pins. A portion of the fuel assemblies, namely a lower end fitting (38) rests on the pads. Specifically, alignment posts (60) extend downward from a lower end plate (54), and a bottom surface of the alignment posts rest on the top surface of the pads. Notably, Anthony does not describe nor suggest at least one groove in the bottom surface of the lower end plate (54) of the fuel assembly.

Claim 1 of the present application recites "[a] nuclear reactor core support apparatus for supporting fuel assemblies in a reactor pressure vessel including a core, said apparatus comprising: a reactor core shroud; a plurality of support beams coupled to said reactor core shroud; and a plurality of removable support plates disposed on said plurality of support beams, each said removable support plate comprising a top surface and an opposing bottom surface, and at least one groove in said bottom surface, each said groove sized to engage one of said support

beams where a portion of said beam is positioned in said groove, said removable support plate in direct contact with said beam."

Anthony does not describe nor suggest a nuclear reactor core support apparatus for supporting fuel assemblies in a reactor pressure vessel as recited in Claim 1. Particularly, Anthony does not describe nor suggest an apparatus having a removable support plate including at least one groove in the bottom surface, with each groove sized to engage one of the support beams where a portion of the beam is positioned in the groove and the removable support plate in direct contact with the beam. Rather, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, where the fuel assemblies are supported and aligned by the pads and pins. Anthony does not describe a removable support plate. The Office Action, at page 21, suggests that the lower end plate (54) of the fuel assembly (16) is the removable support plate of a nuclear reactor core support apparatus which has a stated purpose of supporting the fuel assembly. Applicants submit that the lower end plate (54) cannot be an integral element of the fuel assembly (16) and also an integral element of a separate nuclear reactor core support apparatus at the same time. Further, alignment posts extend downward from the lower end plate of the fuel assemblies and a bottom surface of the alignment posts rest on a top surface of the pads.

Also, Anthony does not describe nor suggest a support plate groove in the bottom surface of a support plate sized to engage one of the support beams where a portion of the beam is positioned in the groove and the removable support plate is in direct contact with the beam. In fact, the fuel assemblies described in Anthony do not even contact the support beams. Rather, and in contrast to the present invention, the fuel assemblies rest upon the metal pads.

Additionally, Applicants respectfully traverse the suggestion in the Office Action, dated 12/23/04, at page 8, that Anthony describes a removable support plate including at least one groove configured to mate with a support beam. Specifically, the Office Action recites "each said removable plate (54) comprising at least one groove (4 grooves labeled (62)) configured to mate with one of said plurality of support beams (via beam/protrusion combination 19, 21, 22, and 23)." Applicants respectfully submit that the depressions (62) described in Anthony are NOT grooves in the lower surface of the support plate. Rather the depressions are part of the alignment posts that extend from the side of the support plate (54). Also, each cylindrical depression does not receive a portion of the support beam, but rather, receives and engages an upwardly extending alignment pin (23). *See Col. 4, lines 34-37.* Notably, Anthony does not describe or suggest that the cylindrical depressions engage the support beams with the removable support plate in direct contact with the beam. In fact the Office Action, at page 14 admits that in Anthony, "the support plates are indirectly mating with the support beams". Accordingly, for the reasons set forth above, Applicants submit that Claim 1 is patentable over Anthony.

Claim 5 has been canceled.

Claims 2-4 and 6 depend from independent Claim 1. When the recitations of Claims 2-4 and 6 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-4 and 6 likewise are patentable over Anthony.

Claim 13 of the present application recites "[a] nuclear reactor comprising: a reactor pressure vessel; a reactor core located inside said reactor pressure vessel; a core shroud surrounding said core; and a core plate located inside said reactor pressure vessel, said core plate comprising: a plurality of support beams coupled to said core shroud; and a plurality of

removable support plates disposed on said plurality of support beams, each said removable support plate comprising a top surface and an opposing bottom surface, and at least one groove in said bottom surface, each said groove sized to engage one of said support beams where a portion of said beam is positioned in said groove, said removable support plate in direct contact with said beam."

Anthony does not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, and as explained above, Anthony does not describe nor suggest a nuclear reactor having a removable support plate including at least one groove in the bottom surface, with each groove sized to engage one of the support beams where a portion of the beam is positioned in the groove and removable support plate in direct contact with said beam. Rather, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, where the fuel assemblies are supported and aligned by the pads and pins. Additionally, Applicants respectfully traverse the suggestion in the Office Action, dated 12/23/04, at page 8, that Anthony describes a removable support plate including at least one groove configured to mate with a support beam. Specifically, the Office Action recites "each said removable plate (54) comprising at least one groove (4 grooves labeled (62)) configured to mate with one of said plurality of support beams (via beam/protrusion combination 19, 21, 22, and 23)." Applicants respectfully submit that the depressions (62) described in Anthony are NOT grooves in the lower surface of the support plate. Rather the depressions are part of the alignment posts that extend from the side of the support plate (54). Also, each cylindrical depression does not receive a portion of the support beam, but rather, receives and engages an upwardly extending alignment pin (23). See *Col. 4, lines 34-37.* Notably, Anthony does not describe or suggest that the cylindrical

depressions engage the support beams with the removable support plate in direct contact with the beam. In fact the Office Action, at page 14 admits that in Anthony, "the support plates are indirectly mating with the support beams". Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Anthony.

Claim 15 depends from independent Claim 13. When the recitations of Claim 15 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claim 15 likewise is patentable over Anthony.

For the reasons set forth above, Applicants respectfully request that the Section 102(b) rejection of Claims 1-6 and 13 and 15 be withdrawn.

The rejection of Claims 1-6 under 35 U.S.C. § 102(b) as being anticipated by Rinderer (U.S. Patent No. 5,782,439) is respectfully traversed.

Rinderer describes a support system for transmission lines that includes a plurality of rail sections attached to the top surface of a hub. Rinderer does not describe nor suggest any type of apparatus that can be used in a nuclear reactor core.

Rinderer does not describe nor suggest a nuclear reactor core support apparatus for supporting fuel assemblies in a reactor pressure vessel as recited in Claim 1. Particularly, Rinderer does not describe nor suggest an apparatus having a reactor core shroud, a plurality of support beams coupled to the reactor core shroud, and a removable support plate including at least one groove in the bottom surface, with each groove sized to engage one of the support beams where a portion of the beam is positioned in the groove and the removable support plate is in direct contact with the beam. Rather Rinderer describes a support system for transmission lines that includes a plurality of rail sections attached to the top surface of a hub member. The

hub 50 does not include a plurality of grooves on its bottom surface that are sized to engage one of the support beams where at least a portion of the beam is positioned in the groove. Rather, the rails 14 are attached to the upper side of the hub. Particularly, the rails 14 are attached to the upper surface of a flange 64 that extends around the perimeter of the hub. Also, Rinderer does not describe support beams coupled to a reactor core shroud. Accordingly, Applicants submit that Claim 1 is patentable over Rinderer.

Claim 5 has been canceled.

Claims 2-4 and 6 depend from independent Claim 1. When the recitations of Claims 2-4 and 6 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-4 and 6 likewise are patentable over Rinderer.

For the reasons set forth above, Applicants respectfully request that the Section 102(b) rejection of Claims 1-6 be withdrawn.

The rejection of Claims 1-5 under 35 U.S.C. § 102(b) as being anticipated by Bettinger (U.S. Patent No. 3,811,237) is respectfully traversed.

Bettinger describes a raised floor panel and assembly for computer and similar installations. The panels are supported above a subfloor on pedestals. Bettinger does not describe nor suggest any type of apparatus that can be used in a nuclear reactor core.

Bettinger does not describe nor suggest a nuclear reactor core support apparatus for supporting fuel assemblies in a reactor pressure vessel as recited in Claim 1. Particularly, Bettinger does not describe nor suggest an apparatus having a reactor core shroud, a plurality of support beams coupled to the reactor core shroud, and a removable support plate including at least one groove in the bottom surface, with each groove sized to engage one of the support

beams where a portion of the beam is positioned in the groove and the removable support plate is in direct contact with the beam. Rather, Bettinger describes a floor system for a computer room. Accordingly, Applicants submit that Claim 1 is patentable over Bettinger.

Claim 5 has been canceled.

Claims 2-4 depend from independent Claim 1. When the recitations of Claims 2-4 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-4 likewise are patentable over Rinderer.

For the reasons set forth above, Applicants respectfully request that the Section 102(b) rejection of Claims 1-5 be withdrawn.

The rejection of Claims 1-8, 10, 11, 13 and 15-18 under 35 U.S.C. § 103(a) as being unpatentable over Challberg (U.S. Patent No. 6,813,327) in view of Sodergard (U.S. Patent No. 3,650,895) and further in view of Naka et al. (U.S. Patent No. 4,922,670) is respectfully traversed.

Challberg describes a nuclear reactor core plate assembly that includes a plurality of support beams, a flat plate positioned on top of the support beams and a plurality of fuel supports positioned on top of the flat plate and extending through the flat plate. Challberg does not describe nor suggest at least one groove in the bottom surface of the flat plate, with each groove sized to engage one of the support beams where a portion of the beam is positioned in the groove.

Sodergard describes exchangeable control rod guide tubes for a nuclear reactor. The guide tubes are supported by the bottom of the reactor pressure vessel and carry square support blocks at the upper end of the guide tubes. The support blocks are arranged in an edge to edge

relationship to form an even bottom for the reactor core. Sodergard does not describe nor suggest support beams coupled to a core shroud, nor that the support blocks include at least one groove in the bottom surface, with each groove sized to engage a support beams where a portion of the beam is positioned in the groove. Further, Applicants submit that, in contrast to the suggestion at page 22 of the Office Action, Figure 3 of Sodergard does not illustrate a groove on the bottom surface of block 8. In fact none of Figures 1-7 of Sodergard illustrate a groove on the bottom surface of block 8.

Naka et al. is non analogous art that describes a double flooring structure that is used in a floor of a computer room. The teachings of Naka et al. have no applicability or use inside a nuclear reactor pressure vessel and it would not be obvious to one skilled in the art to combine the teachings of Naka et al. with the teachings of Challberg and Sodergard. Further, Naka et al. do not describe nor suggest a removable support plate that includes at least one groove in the bottom surface, with each groove sized to engage a support beams where a portion of the beam is positioned in the groove. Rather, Naka et al. describe a floor panel that includes a lip (step portion 14f) around the edge of the floor panel. Applicants submit that the lip described in Naka et al. is not a groove in the bottom surface of the floor panel.

Challberg, Sodergard, and Naka et al., alone or in combination, do not describe nor suggest a nuclear reactor core support apparatus for supporting fuel assemblies in a reactor pressure vessel as recited in Claim 1 or a nuclear reactor as recited in Claim 13. Particularly, Challberg, Sodergard, and Naka et al., alone or in combination, do not describe nor suggest an apparatus having a plurality of removable support plates with each support plate including at least one groove in the bottom surface, with each groove sized to engage one of the support

beams where a portion of the beam is positioned in the groove and the removable support plate is in direct contact with the beam. Rather, Challberg describes only one core plate, and Challberg does not describe nor suggest a removable support plate that includes at least one groove in the bottom surface, with each groove sized to engage one of the support beams where at least a portion of the beam is positioned in the groove. The core plate of Challberg does not include any grooves. The Office Action, at page 21, has admitted that "Challberg does not specifically disclose that the support plate is made up of a plurality of sub plates". Further, Sodergard describes support blocks that are arranged in an edge to edge relationship to form an even bottom for the reactor core and that are positioned on the upper end of the guide tubes. Sodergard does not describe nor suggest that the support blocks include at least one groove in the bottom surface, with each groove sized to engage a support beams where a portion of a beam is positioned in the groove. Rather, Sodergard describes that the support blocks a carried by the upper portion of the guide tubes. Specifically, Sodergard teaches a fuel support apparatus that does not include support beams. Modifying the teachings of Challberg with the teachings of Sodergard does not produce an apparatus having a plurality of removable support plates with each support plate including at least one groove in the bottom surface, with each groove sized to engage one of the support beams where a portion of the beam is positioned in the groove and the removable support plate is in direct contact with the beam because neither Challberg or Sodergard teaches a removable support plate with at least one groove in the bottom surface. Applicants disagree with the assertion that it would be obvious to incorporate a groove because Figures 5, 6, and 10 of Challberg and Figures 5-7 of Sodergard show the use of grooves as a means of securing or aligning various components. Applicants submit that Figures 5, 6, and 10 do not show the use of

grooves as a means of securing or aligning various components. Figures 5-7 of Sodergard show a seal ring 15 positioned inside a groove 14 of the guide tube. Applicants submit that there is no suggestion or motivation in Challberg or Sodergard to use slots located in the bottom surface of a removable support plate that are sized to receive a portion of the support beams. Particularly, Challberg does not teach the use of slots and Sodergard teaches away from the use of support beams so that "it is possible, without dismantling the entire core bottom for the repair of a guide tube, to take this tube out of the nuclear reactor with its support block".

Further, Naka et al. do not describe nor suggest a removable support plate that includes at least one groove in the bottom surface, with each groove sized to engage a support beams where a portion of the beam is positioned in the groove. Rather, Naka et al. describe a floor panel that includes a lip (step portion 14f) around the edge of the floor panel. Applicants submit that the lip described in Naka et al. is not a groove in the bottom surface of the floor panel. Further, it would not be obvious to combine the teachings of Naka et al. with the teachings of Challberg and/or Sodergard because Naka et al. is non analogous art that describes a double flooring structure that is used in a floor of a computer room. The teachings of Naka et al. have no applicability or use inside a nuclear reactor pressure vessel. Therefore, it would not be obvious to one skilled in the art to combine the teachings of Naka et al. with the teachings of Challberg and/or Sodergard.

Furthermore, Applicants submit that it would not obvious to combine the teachings of Sodergard with the teachings of Challberg because Challberg already includes a plurality of fuel bundle supports positioned on and extending through the flat core plate. The fuel bundle supports include coolant flow channels that are designed to provide uniform coolant flow through the fuel bundle even if the fuel bundle coolant flow inlet is aligned with a support beam.

By replacing the core plate of Challberg with the support blocks of Sodergard would also remove the support beams because the Sodergard support blocks mount directly onto the guide tubes and there is no need for support beams. This arrangement would destroy the need for the Challberg fuel bundle supports which are the novel feature of the Challberg invention. Destroying the inventive purpose of the Challberg invention by incorporating the teachings of Sodergard would make the combination nonobvious.

At least for the reasons explained above, Applicants submit that Claims 1 and 13 are patentable over Challberg, Sodergard, and Naka et al., alone or in combination.

Claim 5 has been canceled.

Claims 2-4, 6-8, and 10-11 depend from independent Claim 1 and Claim 15-18 depend from independent Claim 13. When the recitations of Claims 2-4, 6-8, and 10-11, and Claims 15-18 are considered in combination with the recitations of Claims 1 and 13 respectively, Applicants respectfully submit that dependent Claims 2-4, 6-8, 10-11, and 15-18 likewise are patentable over Challberg and Sodergard, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 1-8, 10, 11, 13 and 15-18 be withdrawn.

The rejection of Claims 19 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Challberg (U.S. Patent No. 6,813,327) in view of Sodergard (U.S. Patent No. 3,650,895), and further in view of Naka et al. (U.S. Patent No. 4,922,670), and still further in view of Dalke et al. (U.S. Patent No. 5,519,746) is respectfully traversed.

As explained above, Challberg, Sodergard, and Naka et al., alone or in combination, do not describe nor suggest a nuclear reactor as recited in Claim 13. Particularly, Challberg,

Sodergard, and Naka et al., alone or in combination, do not describe nor suggest a plurality of removable support plates where each removable support plate includes at least one groove in the bottom surface, with each groove sized to engage one of the support beams where at least a portion of the beam is positioned in the groove.

Dalke et al. is cited for teaching an inter-bundle support plate 140. Dalke et al. is not cited for and do not teach a plurality of removable support plates where each removable support plate includes at least one groove in the bottom surface, with each groove sized to engage one of the support beams where at least a portion of the beam is positioned in the groove. As explained above, Challberg, Sodergard, and Naka et al., alone or in combination, do not describe nor suggest such a structure.

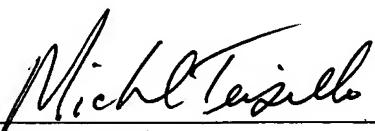
Challberg, Sodergard, Naka et al., and Dalke et al., alone or in combination, do not describe nor suggest a nuclear reactor as recited in Claim 13. Particularly, Challberg, Sodergard, Naka et al., and Dalke et al., alone or in combination, do not describe nor suggest a plurality of removable support plates where each removable support plate includes at least one groove in the bottom surface, with each groove sized to engage one of the support beams where at least a portion of the beam is positioned in the groove. Accordingly, Applicants submit that independent Claim 13 is patentable over Challberg, Sodergard, Naka et al., and Dalke et al., alone or in combination.

Claims 19 and 20 depend from independent Claim 13. When the recitations of Claims 19 and 20 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 19 and 20 likewise are patentable over Challberg, Sodergard, Naka et al., and Dalke et al., alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 19 and 20 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,


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